In this lab, we will examine subjects’ skin conductance as they view a series of photographs varying in content and emotional valence. We will also analyze the eye-blink component of the startle reflex by recording EMG activity from the orbicularis oculi in response to acoustic probes (60 ms bursts of 100 dB[A] white noise) presented at unpredictable times during the photo presentation. Our goal is to determine whether these physiological responses are related to the nature of the stimulus images.

Data collection per se will take about 12 minutes, but with electrode application, equipment configuration, and clean-up time added, you should allow at least 30 minutes per subject to complete the exercise.

### MATERIALS

- 4-mm Ag/AgCl electrodes and collars (2)
- 8-mm Ag/AgCl pre-wired electrodes and collars (3)
- EC33 paste
- Electrode prep pad
- ECI Electro-Gel
- Surgical tape
- 10cc syringe
- Blue aircraft-style headset

### OVERVIEW

**MATERIALS**

- 4-mm Ag/AgCl electrodes and collars (2)
- 8-mm Ag/AgCl pre-wired electrodes and collars (3)
- EC33 paste
- Electrode prep pad

**EQUIPMENT CONFIGURATION**

**Skin Conductance Amplifier (SCR-B 06)**

- All toggle switches on control unit = up
- Calibrate buttons on subject box = out (off)

**Bioamplifier (Bio-B 02)**

- High pass filter = 30 Hz
- Low pass filter = 500 Hz
- Hum filter off
- Gain = 1 mV (adjust as necessary)
- Calibration and impedance buttons out (subject side)

Bio-B will be used to measure EMG activity from the orbicularis oculi to identify startle blinks. The positive (+) output of Bio-B must be connected to the rectifier to its immediate left (R/I-B).

**Rectifier-Integrator (R/I-B)**

- Output control switch = Integrated
- Time constant = 50 ms
R/I-B will be used to **rectify and integrate the EMG signal** it receives from Bio-B. The output of R/I-B must be connected to address 2 of the PC32-1 A/D converter. Make sure to set the R/I-B time constant to 50 ms and the output control to "Integrated."

### White Noise Generator (Noise)
- Attack/decay = 0 ms
- Output = 50%

### Communications Module (COMM)
- Subject volume (adjust as desired)
- Operator volume (adjust as desired)
- Squelch (adjust to middle value)
- Mode toggle = Norm

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**SUBJECT PREPARATION**

### Skin Conductance Electrodes

These should be placed on the subject first, so that adaptation takes place while you're going about other preliminaries.

**Primary placement.** Remove two electrodes from the saline container and dry them with a paper towel. Follow the instructions provided in *Basics of Skin Conductance Recording* carefully. Affix the electrodes to the volar (palmer) surface of the distill phalanges (the fingerprint region) of the left hand. Run the leads down the fingers toward the palm, and wrap a loop of paper tape around the lead and medial phalange of each finger to relieve stress on the electrode. Further secure each electrode with a loop of paper tape around the fingertip.

**Alternative placement.** If the subject has cuts or calluses on his/her fingertips, or if he/she has slender fingers that make it difficult to secure electrodes to the fingertips, opt instead for the thenar and hypothenar eminences of the subject's left hand. Place the electrodes so that the leads travel toward the wrist and secure them at that point with a strip of paper tape.

Plug the electrode leads into the "B" subject box (it doesn't matter which lead goes into which socket).

### Eye-Blink Electrode Application

The eye-blink component of the acoustic startle reflex will be recorded from 4-mm Ag/AgCl electrodes placed under the left eye over the *orbicularis oculi*. The subject will be grounded through an 8 mm electrode centered high on forehead. Be sure to match these electrodes with the appropriately-sized adhesive collars. *ECI Electro-Gel* will be the electrolyte for all electrodes.

The *orbicularis oculi* and ground electrode sites should be thoroughly cleaned by wiping them vigorously with an electrode prep pad. It is best to have the subject clean the *orbicularis* sites him / herself (with eyes closed to keep out the alcohol fumes). Allow the sites to dry before proceeding. Give careful thought to the orientation of each electrode on the subject's face. Keep lead wires and the blue collar tabs away from the subject's eye (see illustration).

**Orbicularis electrodes.** Draw 1-2 cc of *ECI Electro-Gel* into a syringe. Before placing the collar on the 4mm electrodes, partially fill the electrode...
cavity, taking special care to completely cover the electrode disk with *Electro-Gel*. Then strip the backing from one side of an adhesive collar, center it on the electrode rim, and press the electrode collar-down on the table top to secure the collar to the rim. Then finish filling the electrode cavity. Overfilling the electrode slightly and grading off the excess with the side of a toothpick is a good technique. When you remove the remaining backing paper from the electrode collar, any gel that was smeared during the grading process will be removed with the paper.

Place the first electrode so that its disk is centered 1 cm directly below the outer canthus (corner) of the left eye. Place the second electrode so that its center is 1.5–2 cm medial to the center of the first electrode. The upper edges of the electrode housings should parallel the rim of the eyelid. Loosely braid the electrode wires together along their length to help cancel out the impact of electrical noise. Drape the lead wires loosely over the subject's ear, making sure that there is no stress on the electrodes themselves. To further reduce movement artifact and pull on the electrodes, you may wish to use a small piece of surgical tape to tack the leads to the subject's cheek.

Plug the *orbicularis* leads into the red and white inputs of *Bioamp B* (it doesn't matter which electrode goes where).

**Ground electrode.** Place a collar on one of the 8-mm electrodes and carefully fill the electrode with *Electro-Gel*. Affix it to the previously cleaned site in the center of the upper forehead, running the lead over the top of the subject's head so that it will be held in place by the headset pad.

Plug the ground electrode into the designated subject ground input on EEG Unit A.

**Final Preparation**

1. Help the subject don the blue aviation-style headset. Adjust the microphone so that it is about 1 inch from the corner of the subject's mouth.

2. Turn on the subject's monitor and the table lamp. Turn off the overhead lights before leaving the room.

**RUN INSTRUCTIONS**

**Operator**

1. Boot the *Psylab* and *Control* computers.

2. Launch *DirectRT* from the *Start* menu on the *Control* computer.

3. Choose *Select and run an input file* from the *File* menu of *DirectRT*. Navigate to the Psyc305\Lab4 folder and launch the *Lab4.csv* file.

4. Enter the subject's lab ID number in the *Subject ID* window and click *OK*.

5. A "Welcome to Lab 4" screen will appear. This screen will persist until you press the *enter* key to begin the run. *DirectRT is now staged.*

6. Launch *Psylab* by clicking the second button on the taskbar. Locate and launch the *lab4.pcc* program (c:\cpi\psyc305\lab4\lab4.pcc). Open the Lab 4 rawdata folder and name the data file *xxlab4* (inserting the subject's lab ID number).

7. When prompted by *Psylab*, enter the subject's ID number but DO NOT hit *<Enter>*. *Psylab is now staged.*

8. To start the data collection run, hit *<Enter>* to start *Psylab* recording first. Then switch to Control and hit *<Enter>* to begin stimulus presentation.

9. Instructions to the subject will begin displaying on the Control monitor. Eventually, the instructions will include a message indicating that the operator should turn off his/her monitor to prevent pre-exposure to the stimuli. When you have turned off the monitor, hit *<Enter>*. Control will manage
the run from this point, and the Psylab computer will reboot when stimulus presentation is complete.

10. During the run, you will notice that the Psylab channel traces appear to race ahead from time to time. This behavior is perfectly normal. It occurs as a consequence of the sampling rate increasing from 100 Hz to 1000 Hz during crucial EMG measurement epochs.

Subject

Sit quietly during the presentation and attend closely to the pictures. As I mentioned in class, some of the pictures are unpleasant. Should you find them unbearably so, you may quit the run without penalty of any sort.

CLEANUP

1. Carefully clean the Ag/AgCl electrodes with distilled water in the manner described in Basics of Skin Conductance Recording. Return the clean electrodes to the lab and cover them with a card to prevent exposure to the light.

2. Thoroughly clean the syringe by pumping clear water through it.

3. Shut down the computers, monitors, and equipment in the appropriate manner.

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